APPENDIX A

METHOD AND SYSTEM FOR EXTRACTING MEDICAL INFORMATION FOR PRESENTATION TO MEDICAL PROVIDERS ON MOBILE TERMINALS

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a technique for accessing medical databases and delivering the content thereof to medical providers through a mobile terminal.

Description of the Related Art

Medical providers are notoriously resistant to change in their workplace. As a result, they frequently do not accept new technology simply because it is new and may be better. Medical providers often only accept change when they have to or when it truly does make their job demonstrably easier and/or faster.

Conversely, a common complaint among many medical providers is the lack of access to information needed to treat patients effectively. Medical providers are loath to travel to an inconveniently located desk top terminal or workstation only to spend ~~two or three minutes~~ several minutes logging into the system, accessing a database, ~~and then slowly~~ sifting through the medical records that may be contained therein in an attempt to find a bit of desired information; and then transcribing it or printing it out

Medical institutions, such as hospitals, may have a paper file with hard copies of the pertinent medical information, but again, this is cumbersome, antiquated, and not always orderly. As more hospitals move to electronic databases, even these outmoded records may be hard to come by. Thus, the two primary vehicles by which medical records may be accessed are inadequate to help medical providers access the medical records where they are needed the most - by the patients' bedsides.

The present invention comprises providing medical providers with medical records in a mobile terminal so that the medical providers may access the medical records without being tied to a desktop workstation. An individual or a company, both herein referred to as a service provider, may be the moving force behind these activities. It is expected that the service provider will be a profit oriented business who also desires to see the quality of care to patients improve by the provision of the medical records to the medical providers.

Initially, the service provider will have to acquire the medical records in a format that is amendable to presentation on the mobile terminals. A flow chart of this initial process is illustrated in Figure 1. The service provider, or a representative of the service provider, may contact the managers of the databases containing the medical records (block 10). It is expected that these managers may be hospitals or companies to whom hospitals have outsourced the medical record maintenance responsibilities. E.g., Cerner and Shared Medical System. **Inventors - do these companies actually manage the database or are they merely the software providers?** THEY CAN COMPLETELY MANAGE THEM OR JUST SELL THE SOFTWARE, DEPENDING ON PREFERENCE OF HOSPITAL

Additionally, it is possible that medical providers who are not associated with a hospital (e.g., a practice group, a partnership, a solo practitioner, or the like) may have medical records amendable to incorporation and use in the present invention. Thus, the service provider may also contact such individuals or groups and the present invention is not restricted to hospitals per se. **Inventors - do you want to include this group?** YES

used as desired. **(inventors - are all these databases going to be HL7 certified? Is the database you create HL7 compatible?)** OUR SYSTEM IS AIMED AT HL7 INSTITUTIONS. WE USE AN INTERFACE ENGINE TO EXTRACT THE PATIENT INFORMATION FROM THE HL7 DATA STREAMS & REFORMAT IT IN A STANDARD WAY TO BE INSERTED INTO OUR STAGING DATABASE (ORACLE). **(also - do you have an exemplary print out of how the data is stored before transformation and then after transformation?)** I WILL OBTAIN THIS FOR YOU AND EMAIL IT. Either of the last two cases greatly simplifies the extraction and translation of the data from the original database to the new database created by the service provider.

The purpose of the extraction and reformatting is to present the data of the medical records in a format that is acceptable for display on a mobile terminal. To facilitate an explanation of the methodology of the present invention, what follows is a discussion of the hardware. The term mobile terminal is intended to be a broad ranging term and includes mobile phones, personal digital assistants (PDA), pagers, and the like. However, the present application will focus on two such devices, namely personal digital assistants (mobile terminal 50) such as that illustrated in Figure 2 and mobile phones (mobile terminal 100) such as that illustrated in Figure 4. Mobile terminal 50 may be a PALM PILOT® or the like and may comprise a display 52 and a plurality of buttons 54 as is conventional. Display 52 may include a data field 56 comprising a patient's name field 58, a movement icon 60 and a plurality of special icons 62. As is conventional on most personal digital assistants, display 52 may comprise some form of touch screen, accepting inputs by touching the display 52. Display 52 may further comprise a data entry field 64 used in conjunction with a stylus (not shown) as is conventional. In one embodiment, the display 52 comprises a color display with the icons and information

also sold by Ericsson. Other networks are also possible. Mobile terminals 100 may move around within the local system just like they move about in a normal cellular system. Note further that the local wireless system need not be connected to the PLMN 162 if so desired. For example, for security reasons, it may be desirable not to allow access to the PLMN 162 and the PSTN 166.

In addition to making normal phone calls, receiving pages, short message services and the like, the mobile terminals 100 may also selectively access the server 152 and secure therefrom a medical record formatted according to the present invention. It should be appreciated that appropriate encryption technology may be used so as to preserve the privacy of the medical information. The medical record is then displayed on the display 110 of the mobile terminal 100. In particular, mobile terminal 100 communicates via antenna 112 to a nearby radio head 154 and accesses server 152 through the CRI 150. The server obligingly provides the requested information, which in turn is broadcast from the radio head 154 to the mobile terminal 100 for display. Any updates entered by the medical provider are forwarded upon entry by the medical provider to the server 152.

Note that servers 70, 152 may communicate with the computer containing the original, unaltered database of medical records, providing updates thereto as needed or desired. Thus, these computers may be networked through a conventional approach, selectively connected over a modem or the like as needed or desired.

Inventors, if you have a particular architecture for any of the above please provide. I have endeavored to use two architectures that make sense, but they are little more than educated stabs in the dark.

I WILL SEND A POWER POINT PRESENTATION WITH THIS.

IN GENERAL, IT EMPHASIZES THAT ALL THIS DATA IS DIRECTLY FROM HOSPITAL DATA BASE

icons 118 are illustrated in tabular form in Figure 6. Scroll icons or buttons 200 act to move medical providers between different menus or allow different icons 118 to be displayed in of icon section 116. These icons may be used in place of the need for buttons on the mobile terminal 50 or 100.

Other possible icons include thermometer icon 202 that shifts the medical provider to an information screen containing information relating to the patient's vital statistics. This may be a free form data entry field to record daily events. Further, it is contemplated that the previous day's text is reproduced automatically for the next day with some indicia (such as an asterisk) that the text is reproduced. Thus, the medical provider does not have to re-enter duplicative data every day.

Prescription icon 204 shifts the medical provider to an information screen containing information relating to the current medications that the patient is receiving. It may be linked to software that checks for harmful drug interactions or the like.

Other labs icon 206 shifts the medical provider to an information screen containing information relating to lab tests that may have been run for the patient. This may be presented as a pop up list that lists lab results that can then be viewed by selecting from the list. These lab tests may not be the most common sorts of tests, but are used with sufficient regularity to be included. The text of the pop up list is specifically made large enough so that the medical provider can select from the list with their finger rather than having to use a stylus.

Hotlist icon 208 shifts the medical provider to a customizable information screen. Medical providers can indicate which lab tests they desire to see most frequently. This may be related to their specialty area for example. Thus, when this button is tapped, the

medical provider is taken to the tests that provide him with the most information. For example, a cardiologist may want to know the results for three certain tests, whereas an intestinal doctor may want to know the results of a different set of four tests. This icon allows the medical provider to program the mobile terminal 50 or 100 to show these desired test results.

CBC icon 210 shifts the medical provider to an information screen containing information relating to test results from a very common set of tests known as CBC.

Chem7 icon 212 shifts the medical provider to an information screen containing information related to test results from a very common set of tests known as Chem7.

Bug icon 214 shifts the medical provider to an information screen containing information related to microbiology cultures. Thus, results from cultures sent on the person are available. E.g., blood infection grew out of E. Coli.

Allergies icon 216 shifts the medical provider to an information screen containing information related to allergies for that particular patient. It may be linked to the information in the prescription screen to check for allergic reactions to proposed medication regimens.

Other data fields include HD - the hospital day, derived from the date of admission on the hospital record; PD - post operative day; DX - diagnosis; OR - operative procedure the patient underwent; and HX - history. It is contemplated that the PD button will cause a calendar to pop up and the medical provider may indicate the day on which an operation occurred. The DX field will allow the entry of free form text so that the medical provider may indicate in their own words the patient's relevant diagnoses. Likewise, the OR field will allow the entry of free form text so that the

medical provider may indicate the nature of the surgery and any other relevant details. Similarly, the HX field allows the entry of free form text about the history of the patient.

Not all of this information need to be stored in the hospital database with the unaltered medical records. Rather, it may stored simply in the central servers, 70, 152 and accessed by the medical providers as needed or desired.

The important thing about the icons is their ability to be seen easily and manipulated easily. They are preferably large enough and ergonomically designed so as to allow actuation without the need for a stylus, but rather may be actuated with a thumb or other finger. They are preferably multicolored and intuitive so that medical providers may at a glance know which icons will take them to what information. The exact placement of the icons on a display is not critical, and may be customized to the medical provider so that the icons most commonly used appear on the main screens in a desired location.

Still other commands/icons may be incorporated into the displays 52, 110. A PRINT command enables the medical provider to use infrared beaming of the patient information to an IrDA compatible printer. THIS IS AN ERGONOMIC INNOVATION TO SPEED WORKFLOW

A "Hotlist/Patient" command allows the medical provider to indicate on the preferred first screen after selecting a patient's name from a list of patients. This may be, for example, the hotlist test results, or a general default screen having HD, PD, and OR information. Other screens are also possible as needed or desired. PATIENT INFO

A NOTE command is a totally freehand blank screen that allows the medical provider to draw notes, pictures, or the like as needed. This command in particular may be persevered in a particular position on the display 52, 110 in every screen, such as the

lower right hand corner. Notes may be erased with an ERASER button on the scribble screen. THIS SCREEN IS TO BE PRESERVED IN ITS MOST RECENT STATE FOR EACH PATIENT, IE. IT WILL REMEMBER ITS CONFIG- EVEN AFTER ACCESSING OTHER SCREENS

A DETAILS command allows the medical provider to secure more details about a particular lab or test result. In particular, it is expected that many lab or test results will be abbreviated with the most commonly desired information presented first. Additional details will be available through the use of this command. THIS WILL BE REQUIRED BY TRACKING THE OBJECTS SET OF INTEREST ON THE SCREEN

An ADD PATIENT command may be displayed as a "+" sign or the like, and allows the medical provider to enter a patient's medical record number manually, and at the next synchronization, the patient's complete medical record will be loaded into the memory of the mobile terminal 50, 100. In the situation where the mobile terminal is a mobile type device, this command will activate a call to the central server 152 and download the information. This feature allows medical providers to acquire access to the medical records of patients that were erroneously omitted from a synchronization or added to the ward after a synchronization visit. OR OTHER UNIQUE PATIENT IDENTIFIER

Other features are also possible. For example, as an alternate revenue generator, the service provider could sell advertising on a "Drug of the Day" icon. PRODUCT This might be located in an unobtrusive portion of the display 110 so as to avoid inadvertent triggering. Medical providers may peruse this feature in down time, such as when waiting on an elevator, eating a meal, or the like. This may eliminate needless interruptions by sales representatives or the like. Further, in one embodiment of the present invention, when medical providers subscribe to the present service, they would identify their specialty areas and qualifications. This may be done to differentiate between medical students and attending physicians, nurses, and the like. With the identification of the specialty areas,

"RIFLE MARKETING" AS OPPOSED TO "SHOTGUN MARKETING" - PATENTABLE BECAUSE LESS COSTLY, ETC

the advertising may be targeted specifically to the desired audience. For example, cholesterol drugs could be advertised to cardio-thoracic surgeons while VIAGRA™ was advertised to a geriatric specialist.

Similarly, as a security measure, if the mobile terminal 50, 100 is not used for an amount of time greater than a predetermined threshold, the medical provider may have to log in to the device. This may done through any well understood user name and password type log in activity. Further, if the mobile terminal 50, 100 is not used for an amount of time greater than a second predetermined threshold, the entire memory of the mobile terminal 50, 100 may be purged of all medical records. This helps insure that access to the confidential medical information is not given to an unauthorized user.

As yet another concern, the Health Insurance Portability Account Act (HIPAA) of 1997 has laid out several federal rules about electronic data transfer as it relates to medical records. Individuals or companies who practice the present invention need to be aware of the contemporaneous interpretation of this statute to comply therewith.

Against this backdrop of hardware and software, the methodology of promoting the service is presented with reference to Figure 7. Initially, the service provider establishes the database with the information formatted in the appropriate manner (block 200). This process was described with reference to Figure 1. The service provider may distribute for free mobile terminals (either personal digital assistants, mobile phones, or other appropriate device) to a select number of medical providers, for example, the first 1,000 medical providers (block 202). At the same time, the service provider could require service contract commitments from the medical providers that have just received a new mobile terminal (block 204). The service contract allows access to the reformatted

MAY BE APPROPRIATE HERE OR ELSEWHERE TO ALLOW FOR USE BY PHYSICIAN EXTENDERS (i.e. PA's, RN's, CASE MGR'S, MED STUDENTS, etc.), OR ANYONE WHO NEEDS ACCESS TO DATA

desired. These additional services may be add-ons to the basic service package, resulting in additional revenue for the service provider, or packaged together as needed or desired.

Exemplary methods of using the present invention by medical providers are presented in Figures 8 and 9 as flow charts. These are exemplary and not intended to be limiting, but are provided to illustrate how the present invention may be used by a medical provider to make his life easier. Figure 8 assumes that the medical provider has a personal digital assistant type mobile terminal 50. In particular, the medical provider is assumed to be a physician. The physician initially secures a mobile terminal 50 and a service contract (block 300). This may be the result of an advertising promotion, word of mouth advertising, or other reason. At some later point, the physician has begun using the personal digital assistant as a calendar and the like. The physician wakes up (block 302) and as part of his morning ritual, checks his calendar on the mobile terminal 50 (block 304) to see the day's appointments. Note that this calendar software is conventional on most personal digital assistants and is not incorporated into the software of the present invention. Both applications reside concurrently in memory on the mobile terminal 50. This may be in the midst of breakfast, between shaving and showering, or whenever is convenient.

The physician then goes to the hospital (block 306). One of the first things that the physician does is to dock his mobile terminal 50 at a docking station 76 to download all the needed medical records to the mobile terminal 50 (block 308). Note that the physician may only get medical records for his patients, the patients on the ward in which the physician works, or some other subset of all available medical records. This preserves memory in the mobile terminal 50 if desired. Some physicians may restrict

occur. Medical providers may dock more often than indicated if desired, or less frequently if desired. Further, updates may have to be entered through other means rather than through the mobile terminals 50 and 100. The flow charts are to illustrate exemplary embodiments.

Inventors, I would like to attach the code that you have written for both the reformatting and this application as an appendix to the application to avoid any enablement issues. We can claim copyright in the code, but it will prove that we have the invention in hand. WHEN DO YOU NEED IT? WE ARE STILL REVISING

The present invention may, of course, be carried out in other specific ways than those herein set forth without departing from the scope and the essential characteristics of the invention. The present embodiments are therefore to be construed in all aspects as illustrative and not restrictive and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

WE ARE SPECIFICALLY DESIGNED TO MIGRATE TO WIRELESS FORMAT ON A PDA (AS OPPOSED TO CELL PHONE) USING BLUETOOTH OR 802.11 STANDARDS. THIS WILL OBVIATE NEED FOR SYNCHRONIZATION -- DATA WILL BE AUTOMATICALLY UPDATED TO PDA AS IT OCCURS

CLAIMS

What is claimed is:

1. A method of presenting medical records for use by a medical provider, comprising:

extracting pre-existing medical records from a database;

formatting said medical records for presentation on a mobile terminal; and

delivering at least one of said formatted medical records to a mobile terminal possessed by a medical provider.

2. The method of claim 1 wherein formatting said medical records for presentation on a mobile terminal comprises providing ergonomic actuators within said medical records to move between different screens containing different information.

3. The method of claim 1 wherein delivering at least one of said formatted medical records to the mobile terminal possessed by the medical provider comprises delivering at least one of said medical records to a wireless telephone. EX PDA WIRELESS ENABLED.

4. The method of claim 1 wherein delivering at least one of said formatted medical records to the mobile terminal possessed by the medical provider comprises delivering at least one of said medical records to a personal digital assistant

5. The method of claim 1 wherein extracting pre-existing medical records from a database comprises extracting pre-existing medical records from a hospital database.